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ABSTRACT

A study was conducted to determine the effectiveness of priming, using the first of several metaphors with common ground (the relationship or similar characteristics between the subject of a metaphor and the term used metaphorically) to facilitate comprehension of successive related metaphors. Ten groups of three to five metaphors with common grounds were generated for a total of 42 metaphors. To verify their common grounds, 30 subjects were asked to sort the metaphors into 10 groups by matching the remaining 32 with one standard from each group. For the priming task, the three metaphors that were clustered together most frequently in eight of the ten groups were embedded in a list of 24 filler metaphors and 48 literal statements, all in the form "some x are y." Sixty undergraduate students were timed as they indicated how easy or difficult it was for them to understand the sentences. They were then given a cued recall task in which they were to fill in the blank space where the topic of the metaphor had been in the 96 test sentences. The results indicated that the filler sentences were responded to more rapidly, were subjectively easier to understand, and were better recalled than either the related or filler metaphors. There were no significant differences between the filler and related metaphors in speed or difficulty of comprehension. The first of the related metaphors was responded to more slowly and was more difficult to understand than were the second and third related metaphors, indicating that priming was effective. (HTH)

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Comprehension of Metaphors: Priming the Ground

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Much of the recent research on metaphor has been directed at discovering how metaphors are understood. Generally, theorists describe metaphors in terms of three elements; the topic or tenor, the vehicle, and the ground. The topic is the subject of the metaphor and the vehicle is the term that is used metaphorically. The ground is the relationship between the topic and vehicle from which the metaphorical meaning is derived. For example, in the metaphor Some roads are snakes, the topic is roads, the vehicle is snakes, and the ground is a conceptual relation like long, curvy and dangerous.

A central problem for metaphor comprehension is the nature of the ground. Two general classes of theories have been formulated: comparison and interaction theories. There are many variations of each type of theory, but some general similarities can be drawn. The comparison theory originated with Aristotle. He proposed that one word in a metaphor is replaced with another word that means the same thing. For example, in John is a fox, the word fox has replaced the word sly. The metaphor is understood when one compares a fox to John and discovers the common feature or attribute, which in this case is slyness. The underlying assumption is that the topic and vehicle share a number of features. In order to understand the metaphor the common features (ground) must be discovered by comparing the topic and vehicle (Billows, 1977; Ortony, 1979).

According to the interaction theory, the topic and vehicle interact to create the ground. There is no comparison of the topic and vehicle to find common features, rather, the elements interact to create the metaphorical ground. The resulting ground is a unique combination of the characteristics of the topic and vehicle, thus metaphor as embodied in the ground enables one to "see" the topic in a new or different way. As Black (1936) said of the difference between the comparison and interaction theories, "Looking at a scene through blue spectacles is different from comparing that scene with

something else" (p. 31, emphasis in original).

The distinction between the comparison and interaction theories is not clear-cut. Both are based on the notion that metaphorical meaning is derived from the relationship between the topic and vehicle. According to either theory, the ground can be conceptualized as ranging from a very specific entity, restricted to a single topic-vehicle combination to a more general, abstract entity.

Efforts to determine the nature of the ground have continued, but it is still not clear whether a ground is so specific that it is restricted to a single metaphor or whether a ground can be shared by a number of metaphors. We tested how metaphor-specific grounds are using a sentence priming task. Our rationale was that if several metaphors are based on a common ground then comprehension of one metaphor should prime another thereby facilitating comprehension. When the first metaphor is encountered, the comprehender must construct the relationship between the topic and vehicle in order to understand the metaphor. Once the ground has been constructed it is not necessary to construct it again, so the comprehension of subsequent metaphors based on the same ground should be facilitated.

Our first task was to construct a number of metaphors that seemed to share a common ground, at least to our intuitions. Ten groups of three to five metaphors were generated, totalling 42 metaphors. All metaphors were of the form Some X are Y and each group was based on a different ground. For example, one group consisted of the metaphors Some roads are snakes, Some rivers are ribbons, Some subways are worms, and Some scarves are whips.

In order to verify that the metaphors in each group actually had the same or similar meanings, we asked 30 subjects to sort the metaphors into ten groups. Each metaphor was typed on a file card. A standard from each group was placed on a table and subjects were instructed to place the remaining 32

metaphors under the standard that had the most similar meaning. Three groups of 10 subjects were presented with three different sets of 10 standards.

The results of the sorting task are presented in Table 1. The proportion of times each metaphor was sorted in its predetermined group is displayed in the first column. The three metaphors in each group which were clustered together most frequently were analyzed further. The proportion of times these three metaphors were clustered together is presented in the second column. The probability of clustering two metaphors in a specific group by chance was .10 and the probability of clustering three metaphors together by chance was .01.

As indicated in the table, clustering far exceeded the levels expected by chance. The proportion of times metaphors were clustered with a standard from the same group ranged from .55 to 1.00 with a mean of .78. Proportions for clustering all three metaphors together ranged from .40 to .90 with a mean of .67. Since subjects' clusterings were so consistent with our intuitive groupings, we concluded that our initial groups contained metaphors with the same or similar meanings.

For the priming task we used the three metaphors that were clustered together most frequently in eight of the ten groups. The two groups in which all three metaphors were clustered together less than an average of .63 were discarded. The eight triads of related metaphors then were embedded in a list of filler items. The fillers consisted of 24 filler metaphors and 48 literal sentences, all of the form Some X are Y. The filler metaphors were metaphorical statements that were unrelated to one another and to the triads of related metaphors. The literal fillers were literally true statements that were unrelated to one another and to the triads of related metaphors. The typicality of the literal fillers varied, with some of the sentences being fairly typical (e.g., Some dogs are setters) and others less typical

Table 1

Proportion of Times Metaphors Were Clustered in Their Predetermined Groups

Metaphor	Clustered in predetermined group	All three clustered together
*Some roads are snakes	.80	
*Some subways are worms	.85	.63
*Some rivers are ribbons	.60	
Some scarves are whips	.20	
*Some clouds are cotton	.80	
*Some pillows are marshmellows	.90	.73
*Some skies are silk	.70	
*Some jobs are jails	.75	
*Some marriages are prisons	.90	.63
*Some drugs are handcuffs	.65	
Some hearts are closets	.17	
*Some rumors are diseases	.80	
*Some criminals are germs	.80	.63
*Some lies are cancers	.70	
Some prejudices are blindfolds	.23	
Some lives are ghettos	.13	
*Some stores are jungles	.60	
*Some buildings are mazes	.55	.40
*Some schools are zoos	.60	
Some homes are dungeons	.10	
*Some encyclopedias are goldmines	.90	
*Some words are jewels	.95	.90
*Some books are treasures	1.00	
Some friends are gems	.77	
Some ideas are diamonds	.90	
*Some stomachs are barrels	.70	
*Some mouths are canyons	.65	.50
*Some cheeks are balloons	.55	
Some legs are tree trunks	.53	
*Some desks are junkyards	.95	
*Some rooms are pigpens	.80	.70
*Some closets are warehouses	.75	
Some minds are swamps	.10	
*Some fogs are coats	.90	
*Some frosts are cloaks	.80	.80
*Some mists are veils	.85	
Some snowfalls are blankets	.67	

Table 1 (continued)

Metaphor	Clustered in pre-determined group	All three clustered together
*Some remarks are daggers	.85	
*Some jokes are spears	.90	.80
*Some tongues are knives	.90	
Some stares are slaps	.83	
Some smiles are razors	.83	

* indicates the metaphors used as standards for their groups

(Some vehicles are airplanes). No content words were repeated in any of the test sentences. In addition to the filler sentences, 18 practice sentences were generated, half of which were metaphors and half which were literal statements.

The presentation order of sentences was constructed as follows. Practice sentences were randomized and presented first. The filler items were randomly ordered and the triads of related metaphors were inserted randomly in the list of fillers. Each triad of related metaphors was presented as a block of three successive sentences. The only restriction on the placement of the related metaphor triads was that there be at least five fillers surrounding each triad. The number of fillers between triads ranged from five to twelve. Within this master list, six different versions were created by systematically rotating the related metaphors within each triad. So, if the three metaphors within each triad were ordered 1-2-3 in version 1, they were ordered 3-1-2 in version 2, 2-3-1 in version 3, 3-2-1 in version 4, 2-1-3 in version 5, and 1-3-2 in version 6. Each triad was presented in the same location in the list, only the order within the triad was varied.

Sixty undergraduate subjects (18 males, 42 females) were tested individually. Ten subjects were shown each of the six versions of the 114 sentence list. All of the sentences were typed in capital letters and reproduced in the center of a slide. The slides were presented via a rear-projection window in an I.A.C. chamber. Subjects were asked to indicate how easy or difficult it was for them to understand the sentences by pressing one of three response keys: the "D" key if the sentence was difficult to understand, the "E" key if it was easy to understand, and the "M" key if it was neither easy nor difficult, but somewhere in between (moderate). The position of the "E" and "D" keys was counterbalanced. The subjects were given a short rest halfway through the list.

In the final phase of the experiment, subjects were given a cued recall

task. They were presented with a randomized list of the 96 test items. Each sentence was typed with a blank space where the topic had been and subjects were asked to fill in the missing topic. For example, for the metaphor Some roads are snakes, subjects were presented with Some _____ are snakes, and were to provide the topic - roads.

The dependent measures were response latency, difficulty ratings, and correct recall probability. Response latency (in hundreths of a second) was measured from the onset of each slide until the response was made. Difficulty ratings were recoded from the response as E=1, M=2, and D=3. Recall was scored as the proportion correctly recalled (exact criterion) in each condition. The data were analyzed in two ANOVAs, using a quasi-F to test for significance across both subjects and item (Clark, 1973). The alpha level was set at $p=.05$ for all effects. Newman-Kuels were used for all individual comparisons. The first ANOVA compared the three different sentence types - literal filler, metaphor filler, and related metaphors. The second ANOVA tested for the effect of position (first, second, or third) within a triad using only the data from related metaphors. In order to have complete data on each metaphor at each position within the triad, subjects were matched across versions on the basis of their mean response latency to the literal fillers. These matched subjects were treated as a single subject in the ANOVA.

As indicated in Table 2, the filler sentences were responded to more rapidly, $F'(2,142)=38.16$, $MSe=17.81$, were subjectively easier to understand, $F'(2,140)=33.96$, $MSe=5.08$, and were better recalled, $F'(2,101)=32.79$, $MSe=1.65$, than either the related or filler metaphors. There were no significant differences between the filler and related metaphors in speed or difficulty of comprehension. However, the filler metaphor topics were recalled more often than were the topics of related metaphors.

These findings were expected given the nature of the sentences. The

Table 2

Mean Response Latencies, Difficulty Ratings, and Strict Recall Scores for Literal Fillers, Filler Metaphors, and Related Metaphors

Dependent Variable	Sentence Type: Literal Filler	Filler Metaphor	Related Metaphor
Response Latency	2.38	3.43	3.25
Difficulty Rating	1.08	1.60	1.53
Strict Recall	.79	.61	.47

literal fillers may have been easier to understand because the subjects were more familiar with their content or had actually encountered the ideas previously. On the other hand, subjects were less likely to have encountered the metaphors before because they are less common. Since there were no significant differences between the two types of metaphors, it appears that they were not perceived differently by subjects. Either type of metaphor, related or filler, was more difficult for subjects to understand and was recalled less often than were the literal sentences. This does not necessarily mean that metaphors are always more difficult to understand than literal expressions. The lack of familiarity with the metaphors may account for the longer response latencies . Ortony et al. (1978) found that familiar idioms were processed as quickly as syntactically and semantically comparable literal sentences. Also, Glucksberg, Gildea and Bookin (1982) found that comprehension of metaphors was so fast that it interferred with responding that the sentences were literally false. Perhaps more common metaphors would have required less processing than the relatively unique metaphors used in this experiment.

As indicated in Table 3, the metaphors in the first position were responded to more slowly, $F'(2,23)=12.71$, $MSe=2.24$, and were more difficult to understand, $F'(2,8)=29.80$, $MSe=.17$, than the metaphors in the second and third positions. There was no significant difference in the recall of topics across the three positions. Although there was a trend of decreasing response times and difficulty ratings as subjects progressed from the first to third position, the decrease between the first and second position was much larger than the decrease between the second and third position.

Priming was effective. The facilitation was large with only one priming metaphor. The first metaphor should have been the most difficult to understand if subjects had to search for or construct a ground. Once the ground was activated the second and third metaphors were understood more easily and

Table 3

Mean Response Latencies, Difficulty Ratings, and Strict Recall as a Function of Position Within Related Metaphor Triads

	Position in Triad		
Dependent Variable	First	Second	Third
Response Latency	3.53	3.15	3.10
Difficulty Rating	1.67	1.47	1.45
Strict Recall	.45	.47	.50

quickly. Since response times and difficulty ratings of metaphors in the second and third position were not significantly different, subsequent access to an already activated ground did not increase its effectiveness.

The recall data provided further evidence that the metaphors within the triads shared a common ground. The topics of related metaphors were recalled correctly less often than either filler metaphors or literal fillers. The majority of errors in recall of the related metaphors were confusions of topics within a related metaphor triad. Subjects confused topics within triads more than twice as often as they confused filler item topics (2.78 mean confusions per subject as compared to 1.28 mean confusions). Perhaps subjects confused the related metaphor topics more often because the topics within a triad could be interchanged without losing the shared meaning, or ground, of the metaphor.

The finding that metaphors could be consistently clustered on the basis of similarity of meaning, that priming was effective, and that topics within a triad were confused in recall indicate that metaphors share a common ground. Since grounds were restricted to unique topic-vehicle combinations, a conceptualization of the ground as a more abstract entity may be more accurate.

A number of researchers have proposed that grounds are fairly abstract. Grounds have been described as "conceptual bases" (Honeck, Riechmann & Hoffman, 1975), the interaction of several domains (Tourangeau & Sternberg, 1982; Verbrugge & McCarrell, 1977), and semantic fields (Glucksberg & Gildea, 1981; Keil, 1981). Glucksberg and Gildea (1981) have found that the comprehensibility of poor metaphors was enhanced when they were primed with their semantic fields. Additional research along these lines will enhance our understanding of the nature of metaphor and the comprehension process.

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